In the claims:

1. (Currently Amended) A quantum-well semiconductor device that senses radiation energy, comprising:

a substrate of a substantially transparent semiconductor material; and

a plurality of quantum-well structures, arranged in columnar shapes~~,~~ and spatially separated from one another by a gap which is electrically insulating, said plurality of quantum-well structures formed over said substrate to form a periodic array to optically diffract light at a wavelength absorbed by said plurality of quantum-well structures,

C3

wherein each quantum-well structure includes, a first conductive contact layer formed over said substrate, a quantum-well stack having a plurality of alternating quantum-well layers formed in parallel over said first conductive contact layer and operating to absorb radiation polarized perpendicularly to said quantum-well layers, and a second conductive contact layer formed over said quantum-well stack, and wherein each quantum-well layer in each quantum-well structure is continuous without a void and has opposing parallel side walls perpendicular to said substrate to form an optical cavity therebetween.

2. (Previously Added) The device as in claim 1, further comprising a plurality of separate metallic elements respectively formed over said plurality of quantum-well structures.

3. (Currently Amended) The device as in claim 1, wherein dimensions and indices of said plurality of quantum-well structures and respective gaps are configured to make ~~each quantum-well structure an~~ said optical cavity in a resonance condition so that a magnitude of received radiation having a polarization perpendicular to said quantum-well layers is greater than a magnitude of received radiation having a polarization perpendicular to said quantum-well layers when the resonance condition is not met.

C3

4. (Previously Added) The device as in claim 1, wherein each quantum-well structure includes at least two different stacks of quantum-well layers which respectively absorb light at two different wavelengths.

5. (Previously Added) The device as in claim 1, wherein gaps between adjacent quantum-well structures include a dielectric

insulator that has an index of refraction less than an index of refraction of each quantum-well structure.

6. (Currently Amended) A quantum-well semiconductor device that senses radiation energy, comprising:

a substrate of a substantially transparent semiconductor material; and

C3 a plurality of quantum-well structures in columnar shapes formed over said substrate to form a periodic array, and spatially separated from one another by a gap which is electrically insulating, wherein each quantum-well structrue has opposing parallel side walls perpendicular to said substrate to form an optical cavity therebetween,

wherein each quantum-well structure includes, a first conductive contact layer formed over said substrate, a quantum-well stack having a plurality of quantum-well layers formed in parallel over said first conductive contact layer to absorb radiation polarized perpendicularly to said quantum-well layers, and a second conductive contact layer formed over said quantum-well stack.

7. (Previously Added) The device as in claim 6, further comprising a plurality of separate metallic elements

respectively formed over said plurality of quantum-well structures.

8. (Currently Amended) The device as in claim 6, wherein dimensions and indices of said plurality of quantum-well structures and respective gaps are configured to make ~~each quantum well structure an~~ said optical cavity in a resonance condition so that a magnitude of received radiation having a polarization perpendicular to said quantum-well layers is greater than a magnitude of received radiation having a polarization perpendicular to said quantum-well layers when the resonance condition is not met.

C3

9. (Previously Added) The device as in claim 6, wherein each quantum-well structure includes at least two different stacks of quantum-well layers which respectively absorb light at two different wavelengths.

10. (Previously Added) The device as in claim 6, wherein gaps between adjacent quantum-well structures include a dielectric insulator that has an index of refraction less than an index of refraction of each quantum-well structure, and wherein dimensions of each quantum-well structure are configured

to form an optical cavity between two opposing side-wall surfaces in said each quantum-well structure with a resonance at a wavelength of absorbed light.

C3

11. (Previously Added) The device as in claim 6, wherein each quantum-well structure further includes quantum well layers formed between said first conductive contact layer and said second conductive contact layer to absorb light at a wavelength different from a wavelength of light absorbed by said quantum-well stack.